Competitive provision of public services:

cost savings over successive rounds of tendering.

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Abstract

We study the evolution of the cost of public service provision when subjected to a competitive tendering process. We add to the existing literature by analyzing cost savings over successive rounds of tendering. Previous results in the literature show that initial cost savings tend to disappear over time with the age of the contract. Our findings suggest that each additional round of tendering will be followed by a renewal of cost savings. Thus, keeping competitive pressure via periodic tendering appears to address the problem.

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1. Introduction

A major public policy change over the last few decades has been the contracting of a range of public services by the state that previously were provided in-house. The award of contracts is done through a competitive tendering process, and the achievement of cost savings is arguably one of the main purposes of the exercise.

A number of economic studies have evaluated the existence and magnitude of such cost savings, typically by comparing costs in a per-unit basis right before and right after the out-contracting of the service. As a rule, costs savings have been found and their magnitude is important (see the reviews by Domberger and Rimmer 1994, Boyne 1998, and Andrews 2011).

Less often, economists have also managed to track how these costs savings evolve over time – and whether they are still in place a few years after the award of the contract. Interestingly, savings tend to decrease with the age of the contract, in some cases enough to eliminate all initial cost savings after a few years (Szymanski and Wilkins 1993, Bello and Szymanski 1996, Szymanski 1996). This is important as it suggests the initial cost discipline imposed by the tendering process tends to disappear over time.

This note contributes to the literature by analysing how cost savings evolve over successive rounds of tendering – an aspect largely unexplored in the existing literature, possibly due to data limitations. Initial contracts were often awarded for a fixed term – a new round of competitive tendering being put in place afterwards. We hypothesize that such a repeated exposure to competitive forces may serve to compel contractors into a cost effective provision.

2. Data and methodology

We study the provision of cleaning and catering services in public hospitals in Scotland over the period 1985 – 1998. This period sees the introduction of competitive tendering for these services by the Conservative governments of Margaret Thatcher and John Major, and by the year 1991 about 80% of hospitals in our sample had contracts in place.

Our data covers 136 Scottish hospitals, which constitute the vast majority of hospitals run by the UK's National Health Service (NHS) in the country. Over the period of study, these hospitals have awarded a total of 179 contracts for cleaning services and 165 contracts for catering services. For cleaning, 129 of these contracts correspond to the first contract ever awarded by the hospital in question ("first-round" contracts), but the remaining 50 are "second-round" and even "third-round" contracts – awarded by re-issuing the service to competitive tendering after a few years. For the case of catering, 123 contracts are "first-round" while the remaining 42 are "second-round". The data has been collected specifically for the purpose of this study from the Scottish Health Boards and NHS Scotland on a confidential basis.[3]

With this data at hand, we investigate the cost savings of successive rounds of competitive tendering using the following econometric specification:

[3] Please refer to Angeles and Milne (2015) for more details on the dataset and for an historical overview of the process.

$$\log c_{i,t} = \alpha_i + \sum_r \sum_y \beta_{ry} roundyear\_ry_{i,t} + \Gamma X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

In equation (1) $c_{i,t}$ is the real unit cost of cleaning or catering services for hospital *i* on the financial year *t*, where the retail price index has been used to deflate nominal costs over time. Parameters α_i are hospital-specific fixed effects, while $X_{i,t}$ is a set of control variables having an effect on real unit costs. These include the quantity of service being provided (for instance, total surface cleaned), five variables capturing hospital size and types of activities, a dummy variable identifying contracts for multiple services, and the real hourly wage paid to the bottom decile of female Scottish workers (an adequate match for the labour force in cleaning and catering).

Of most importance for us is the set of variables $roundyear\_ry_{i,t}$, which is a group of dummy variables identifying the contract round and contract year of observation *i,t*. Within the double sum in (1), subscript *r* denotes contract rounds (*r = 1,2,3*) while subscript *y* denotes the contract year within each round (*y = 0, 1, 2,...*). For example, the dummy variable $roundyear\_23_{i,t}$ takes a value of 1 if hospital *i* is in the 3rd year of its 2nd round contract in year *t*. We also consider negative values of *y* for the first round – in other words, we include dummy variables identifying the years before the start of the first contract in order to capture anticipation effects.

Our empirical methodology implicitly assumes that the decision to re-issue a service to tendering is not related to cost performance. This would be the case if contracts were strictly awarded for a fixed amount of time, but that was not necessarily true. While 3 years was the standard length of first-round contracts, extensions were not uncommon. If the offering of contract extensions was related to cost performance, an endogeneity bias would arise. While one must be aware of this potential bias, its existence would not invalidate most of our analysis as it concerns only coefficients for years 3 and over of each round: there is no selection bias during the first three years of each contract round as all hospitals go through them. Much of what we say in the analysis below remains valid even if we discount the suspected coefficients.

Finally, we consider two variations of equation (1) to control for potential time effects such as technological improvements. First, we add a constant time trend; second, we introduce a full set of time dummies. While the second alternative is more flexible, it is not necessary superior as the dummies for the years 1989 to 1991 may wrongly capture much of the effect of first-round contracts, which were overwhelmingly awarded during these three years.

3. Empirical analysis

Our baseline results are presented in table 1, where the first three columns refer to cleaning services and the last three columns to catering services. Notice that year 0 refers to the year in which the contract in question was awarded, so that year 1 would be the first full year under that contract. Cost reductions for all rounds and years of contract are based on comparisons with each hospital's own costs four years or more before its first-round contract started.

The first column of table 1 estimates the effects of competitive tendering on the cost of cleaning services without controlling for time effects. This column indicates the presence of pre-contract

effects in the form of a reduction in unit costs of about -6% in the last year preceding the first contract. Turning to the first-round contract, large reductions in cost take place during the first two years – reaching -26% during year 1. These cost reductions tend to disappear over time, swiftly falling between years 2 and 5 and even losing statistical significance by year 6.[4]

[Table 1]

The inclusion of a constant time trend (column 2) or time dummies (column 3) reduces the magnitude of these coefficients across the board but the general pattern remains in place. The pre-contract effect observed in column 1 is no longer statistically significant and the maximum first-round cost reduction is -20% in column 2 and -10% in column 3 – in both cases during year 1. From year 4 onwards, the effects of competitive tendering are no longer statistically significant under these specifications.

What's most interesting, and where our analysis adds the most value, is in the estimation of second and third round effects. The evidence from the first three columns of table 3 indicates that such effects not only exist, but that they are considerably larger than the cost reductions obtained during the first round of contracts. Indeed, the estimates from column 1 imply a peak effect of -32% in real unit costs during year 1 of the second round contract; and two-thirds of the effect would still remain in place by the fifth year. Adding a time trend or time dummies reduces the magnitude of this peak effect to -24% in the first case and -19% in the second case – still very large magnitudes. In these two cases, however, the effect does not last beyond the fourth year of the contract.

Finally, we are even able to estimate the effect of a third round contract – bearing in mind that only four hospitals reach this stage in our sample. Here the effects are even larger than before, but we don't have enough data to comment on their permanence over time.

The above results are repeated in a more muted form for catering contracts, as reported in columns 4 to 6 of table 1. First-round contracts see reductions in cost of -10% (columns 4 and 5), which nevertheless disappear by year 5 at the latest. There is also a tendency for cost reductions to re-emerge once second round contracts are awarded, although estimated effects are statistically significant only when we do not include a time trend or time dummies. We also note that our set of regressors is much less successful in explaining the variation of real unit costs for catering services as compared to cleaning services. Indeed, R^2 coefficients indicate that 60% of the variation in the dependent variable is explained in columns 1-3, while the corresponding figure for the last three columns is just 26%.

On table 2, we explore the nature of cost reductions for cleaning contracts in some more detail. First, we partition our sample of hospitals into two groups. In the process of competitive tendering it was often the case that first-round contracts were won by the original service provider, which had been a part of the public authority and was allowed to compete for the service with external contractors. In the UK such newly-created entities are referred to as Direct Service Organizations (DSOs). The first three columns of table 2 restrict the sample to those hospitals whose cleaning

[4] This may not be the case if coefficients for years 3 and onwards are biased and the true cost reductions are larger. It seems more likely, however, that any selection bias would work in the opposite direction as contract extensions would be offered to the better performing firms. In that case, true cost reductions for years 3 and onwards would have been even smaller, reinforcing the result.

services were provided by a DSO (over all contract rounds), while columns 4 to 6 consider hospitals whose cleaning services were provided by an external contractor (over all contract rounds). We may note that previous results in the literature have found external contractors cut costs more than DSOs.

[Table 2]

The second addition in table 2 is a variable controlling for the number of bids submitted for the ongoing contract (if one is in place). This variable is used as a measure of the degree of competition in the bidding process. Following auction theory, we would expect a more competitive environment to lead to larger cost reductions (McAffe and McMillan 1987, Gomez-Lobo and Szymanski 2001, Milne and Wright 2004). We also note that external contractors were more likely to win contracts when a larger number of bids was submitted (Angeles and Milne 2015), so that their superior cost performance, if in place, may be due to them operating under a more competitive environment. If so, this additional variable should control for that effect.

The results in table 2 reveal two things. First, as expected, the number of bids submitted is strongly related to the magnitude of cost reductions. Each additional bid leads to a decrease in costs of between 2.5% and 3% throughout the life of the contract; the effect is statistically significant and does not differ between DSOs and external contractors.

Second, external contractors are able to cut costs deeper and in a more permanent manner than DSOs, even after controlling for the number of bids. For first round contracts, cost reductions peak at -17% for DSOs and disappear by year 4; whereas for external contractors they peak at around -30% and do not fall much over time (although statistical significance may be lost due to the limited number of observations). A comparable pattern can be found for subsequent rounds.[5]

4. Concluding remarks

Our results uncover an intriguing pattern of cost reductions new to the literature. Competitive tendering led to initial cost savings, but these tend to disappear over time – at least for DSOs. Maintaining competitive pressure appears to address the problem, as second and third round contracts see costs falling once again, often beyond first-round reductions. The fact that cost savings are larger with more bids, and when external contractors are used, also supports this assertion.

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[5] Please refer to Angeles and Milne (2015) for a discussion of why external contractors were able to implement larger cost cuts. Among other factors, DSOs were tied to nationally-agreed wage rates whereas external contractors could offer lower wages and employed more part-time workers. This would also explain why cost cuts were smaller in catering services, where non-wage costs are more important than in cleaning.

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Table 1

Baseline results, all hospitals

Dependent variable: real unit costs (in logs)						
	Cleaning services			Catering services		
	(1)	(2)	(3)	(4)	(5)	(6)
Pre-contract effects						
year -3	-0.00876	0.00451	0.0110	-0.0249	-0.0236	0.00103
year -2	-0.0263	-0.00574	0.0189	-0.0388*	-0.0368	0.00911
year -1	-0.0623***	-0.0339	0.0142	-0.0705***	-0.0679***	-0.000131
First round contract						
year 0	-0.162***	-0.126***	-0.0391	-0.105***	-0.101***	-0.0120
year 1	-0.259***	-0.207***	-0.103***	-0.105***	-0.0998***	-0.0180
year 2	-0.209***	-0.149***	-0.0570*	-0.0569**	-0.0516	-0.00442
year 3	-0.135***	-0.0710**	-0.0133	-0.0672**	-0.0616*	-0.0355
year 4	-0.0837***	-0.0181	0.0242	-0.0571*	-0.0511	-0.0218
year 5	-0.0538*	0.0210	0.0646*	0.00858	0.0150	0.0392
year 6	-0.0454	0.0462	0.0703*	0.0310	0.0387	0.0524
year 7	-0.0549*	0.0553	0.0501	-0.0351	-0.0258	-0.00887
year 8 and later	-0.0901***	0.0270	0.00517	-0.0302	-0.0195	0.00956
Second round contract						
year 0	-0.228***	-0.147***	-0.0983**	-0.0506	-0.0437	-0.0208
year 1	-0.321***	-0.242***	-0.193***	-0.0754*	-0.0683	-0.0349
year 2	-0.269***	-0.178***	-0.139***	-0.0796*	-0.0717	-0.0445
year 3	-0.255***	-0.151***	-0.129**	-0.0307	-0.0218	0.00299
year 4	-0.215***	-0.0977	-0.0947	-0.0567	-0.0464	-0.0259
year 5 and later	-0.207***	-0.0750	-0.0829	-0.0358	-0.0242	0.0104
Third round contract						
year 0 and later	-0.492***	-0.362***	-0.330***			
Quantity of services	-0.823***	-0.817***	-0.815***	-0.724***	-0.724***	-0.732***
Multiple contracts	0.112***	0.121***	0.0862***	0.00444	0.00467	-0.0158
Real wage	-0.254	0.112		0.241	0.273	
Hospital characteristics	included	included	included	included	included	included
Time trend	no	-0.0134***	no	no	-0.00109	no
Time dummies	no	no	included	no	no	included
N. of hospitals	136	136	136	136	136	136
N. of observations	1,903	1,903	1,903	1,902	1,902	1,902
R^2	0.597	0.600	0.609	0.264	0.264	0.278

Notes: the symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% level. The dependent variable is cleaning costs per square meter, deflated by the RPI, and catering costs per patient per week, deflated by the RPI.

Table 2

The effects of competition on DSOs and external contractors, cleaning services

Dependent variable: real cleaning costs per m^2 (in logs)						
	DSOs			External contractors		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of Bids	-0.0293***	-0.0245***	-0.0330***	-0.0250**	-0.0246**	-0.0273**
Pre-contract effects						
year -3	-0.00650	0.00264	0.0203	-0.0688*	-0.0724	-0.127**
year -2	-0.0286	-0.0149	0.0333	-0.117***	-0.123*	-0.220**
year -1	-0.0626***	-0.0425*	0.0335	-0.223***	-0.232***	-0.323***
First round contract						
year 0	-0.0829***	-0.0741***	0.0745**	-0.189***	-0.202	-0.268*
year 1	-0.168***	-0.147***	0.00794	-0.332***	-0.347**	-0.416**
year 2	-0.127***	-0.101***	0.0233	-0.260***	-0.278*	-0.360*
year 3	-0.0540*	-0.0242	0.0340	-0.252***	-0.272	-0.388*
year 4	-0.0258	0.00618	0.0389	-0.225***	-0.248	-0.356
year 5	0.0198	0.0604	0.0773*	-0.302***	-0.327	-0.352
year 6	0.0331	0.0864**	0.0617	-0.306***	-0.333	-0.297
year 7	0.0357	0.102**	0.0293	-0.305***	-0.335	-0.264
year 8 and later	-0.00204	0.0684	-0.00728	-0.351***	-0.384	-0.341
Second round contract						
year 0	-0.121***	-0.0979**	-0.0147	-0.435***	-0.467*	-0.456
year 1	-0.173***	-0.152***	-0.0835	-0.526***	-0.560*	-0.542*
year 2	-0.106**	-0.0751	-0.0333	-0.458***	-0.492	-0.461
year 3	-0.132**	-0.0907	-0.0761	-0.515***	-0.551*	-0.539
year 4	-0.124**	-0.0679	-0.105*			
year 5 and later	-0.143***	-0.0758	-0.114*			
Third round contract						
year 0 and later	-0.261**	-0.222*	-0.197	-0.736***	-0.774**	-0.773**
Quantity of services	-0.858***	-0.855***	-0.853***	-0.831***	-0.832***	-0.819***
Multiple contracts	0.0963***	0.109***	0.0487**	0.127**	0.129**	0.166**
Real wage	0.164	0.401		1.358***	1.357***	
Hospital characteristics	included	included	included	included	included	included
Time trend	no	-0.0095**	no	no	0.0025	no
Time dummies	no	no	included	no	no	included
N. of hospitals	98	98	98	23	23	23
N. of observations	1,371	1,371	1,371	322	322	322
R^2	0.641	0.643	0.661	0.791	0.791	0.804

Notes: the symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% level.